THE CLAIMS

WE CLAIM

1. (CURRENTLY AMENDED) A digital radiation sensor for intraoral placement in a mouth of a patient for production of radiographs of teeth and their anatomical supporting structures of bone, periodontal ligaments and gingiva around the root and cervical region of the tooth, said sensor comprising:

a housing containing at least one generally planar, radiation detector providing a digital imaging surface oriented toward a radiation source, said housing conforming to the anatomic curvatures of the human maxillary and mandibular arches of an average patient; and,

at least one radio-opaque fiduciary element of known shape, size and location, [permanently attached to said housing] in a known, permanently fixed spatial position to said digital imaging surface, having a known projected image shape produced by a known angle of incidence between the radiation source and said imaging surface intermediate the radiation source and the surface of said at least one radiation detector, said at least one fiduciary element casting a projected image on said at least one radiation detector when illuminated by a radiation source for determining an unknown angle of incidence between the radiation source and said imaging surface by comparing the projected image shape of the fiduciary element against the projected image shape of the fiduciary element generated by a known angle of incidence to correct for projective distortion in the projected image shape caused by the unknown angle of incidence,

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said at least one digital radiation <u>detector</u> [sensor] <u>comprising at least one radio-</u>

<u>opaque fiduciary element of known shape, size and location embedded on, in or under</u>

<u>said housing intermediate the radiation source and the surface of each of said at least</u>

<u>one radiation detectors, said at least one fiduciary element casting a projected image</u>

<u>on said at least one radiation detectors when illuminated by an x-ray source, said at</u>

<u>least one digital radiation detector</u> further providing a digitized data output

representing the projected image of said fiduciary element, teeth and their anatomical

supporting structures of bone, periodontal ligaments and gingiva around the root and

cervical region of the tooth made on said digital imaging surface of said at least one

radiation detector produced by the radiation detector for use in a digital radiography

imaging system that uses the projected distorted image shape of said fiduciary

element onto said digital imaging surface of said radiation detector for comparison

against a known non-distorted projected image shape of said fiduciary element in

order to generate a corrective transformation for correcting projected distortions in

the data representing the projected images on said digital imaging surface of said

sensor.

2. (CURRENTLY AMENDED) A digital radiation [sensor] <u>detector</u> as in claim

1 wherein said housing contains at least two, generally planar, radiation detectors

abutting at a non-zero angle to form a faceted, generally contiguous imaging surface

oriented toward the radiation source, said angle selected to conform said housing to

the anatomic curvatures of the human maxillary and mandibular arches of the average

patient.

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3. (CURRENTLY AMENDED) A digital radiation [sensor] <u>detector</u> as in claim 2 wherein each adjoining pair of said generally planar detectors abut one another at a fixed angle.

4. (CANCELED)

5. (CURRENTLY AMENDED) A digital radiation [sensor] <u>detector</u> as in claim 2 wherein said fiduciary element is a sphere.

6. (CANCELED)

7. (CANCELED)

8. (CURRENTLY AMENDED) A <u>digital</u> radiation sensor as in claim 1 wherein said housing further having a holding tab protruding therefrom for retention between the teeth for holding the radiation detectors in a fixed position in the patient's mouth.

9. (CANCELED)

10. (CANCELED)

11. (CANCELED)

12. (CANCELED)

13. (CURRENTLY AMENDED) A method for correcting distortions in a radiation sensor used with a digital radiography imaging system for intraoral placement in a mouth of a patient for production of radiographs of teeth and their

anatomical supporting structures of bone, periodontal ligaments and gingiva around the root and cervical region of the tooth, said method comprising the steps of:

Providing a housing containing at least one generally planar, radiation detector providing an imaging surface oriented toward a radiation source, said housing conforming to the anatomic curvatures of the human maxillary and mandibular arches of an average patient;

Placing, by embedding on, or placing in or under said housing, at least one radio-opaque fiduciary element of known shape, size and location, [permanently attached to the sensor housing] in a permanently fixed spatial position to the [sensor] detector imaging surface, intermediate a radiation source and the surface of said at least one radiation detector and placed in a fixed, known spatial orientation to the [sensor] detector imaging plane, said at least one fiduciary element casting a projected image on said at least one radiation detector when illuminated by the radiation source;

Exposing said at least one radiation detector and said at least one fiduciary element to the radiation source to project an image of said at least one fiduciary element and said teeth and supporting structures onto the surface of said at least one radiation detector;

Capturing and digitizing the data representing the projected image of the fiduciary element, teeth and their anatomical supporting structures images of bone, periodontal ligaments and gingiva around the root and cervical region of the tooth on the surface of said at least one radiation detector produced by the radiation detector;

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Analyzing the digitized image data to determine the distortion of the projected

fiduciary image onto the surface of the at least one radiation detectors due to the non-

perpendicularity of the radiation source with respect to the surface of the at least one

radiation detectors from that of an ideal fiduciary image projected onto the surfaces of

the at least one radiation detectors defined by exposure of the fiduciary element to a

radiation source perpendicular to the surface of the at least one radiation detectors,

and determining a corrective transformation that transforms the distorted projected

fiduciary image to that of the ideal fiduciary image; and,

Applying the corrective transformation to the remaining digitized image data in

order to transform the distorted projected image of the teeth and their anatomical

supporting structures of bone, periodontal ligaments and gingiva around the root and

cervical region of the tooth to that of an ideal projected image of the teeth and their

anatomical supporting structures of bone, periodontal ligaments and gingiva around

the root and cervical region of the tooth.

14. (CANCELLED)

15. (CANCELLED)